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ABSTRACT

A study was undertaken to determine if there was a difference in verbal responses in classrooms of teachers who scored high and who scored low on the complexity scale of the Omnibus Personality Inventory (OPI), which measures teacher tolerance of ambiguity and preference for complexity. Forty college English teachers were tested and ranked according to the norms of the OPI. Teachers with the six highest and the six lowest scores were identified and their classes were observed using the Verbal Reaction Behavior Log. This log provides a means for recording teacher behavior according to learning outcomes and objectives as they are typically found in curriculum guides, and codes these behaviors according to three major categories: cognitive, skill, and affective. Each category has subcategoies that classify the behavior in terms of its complexity level. The results showed that high complexity scorers maintained significantly more verbal responses in higher levels of cognition, had more verbal responses in the higher skills levels, and gave more positive reinforcement and personal involvement than did low complexity scorers. Overall, the findings suggest that high complexity teachers have an intellectual disposition that challenges student thought and demands more support for contention, greater divergence in analysis, and more and deeper responses. (FL)

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Teacher Intellectual Disposition and Classroom Interaction

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Teacher Intellectual Disposition and Classroom Interaction

The personality and teaching style of the teacher, whether contrived or spontaneous, appear to influence the environment to which the student is responding and adjusting, and what transpires in the classroom between the teacher and student is apparently influenced to a great extent by the teacher. Alexander and Elson (1971) studied the effects of teacher-initiated personal interactions on the achievements of students, and findings from this study emphasized the importance of affective teacher variables for student learning at higher levels. Harris (1973) found that students taught by a teacher who modeled flexible, divergent, or creative behavior increased in creative behavior more than students with teachers who did not provide such modeling. Experimental studies of questioning by Ward and Tikunoff (1975) and by the Stanford Program on Teaching Effectiveness (1976) found that students who were in classes where more recall questions were asked did slightly better on recall tests, yet students did equally well on integrative questions regardless of what percent of recall questions were asked in class. In a similar vein, Wright and Nuthall found significant positive results in student responses when teachers exhibited a probing behavior (1970); yet Brophy and Evertson did not find a relationship between seeking improved responses and achievement (1976). Other studies have involved areas such as direct and indirect instruction (for example, Flanders, 1970; Samph, 1974); teacher praise (for example, Soar, 1973; Brophy and Evertson, 1974; Stallings and Kaskowitz, 1975); and teacher enthusiasm (for example, Mastin, 1963; Brophy and Evertson, 1976).

In order to investigate the effects of teacher characteristics on pupil achievement, observation of actual instances of instruction in the classroom becomes paramount. Techniques for measuring classroom behaviors began to be available when Medley and Mitzel (1958) published the Observation Schedule and Record (OScAR) and when Flanders (1960) published the initial findings of his Interaction Analysis Categories system (FIAC). Rosenshine (1976) reports that the work of such individuals as Flanders, Medley, and Mitzel ushered in the modern era of studies on teacher effectiveness. Even in this "modern era" only a limited number of studies which investigate the relationship between classroom instruction and student achievement has been conducted and the number of researchers involved is equally small.

A study by Peters and Blues (1978) which focused its attention on the effect of one teacher characteristic, preference for complexity and tolerance to ambiguity as measured by the Co Scale of the Omnibus Personality Inventory, on student achievement in response to literature suggested that high Co OPI teachers contribute more positively than low Co OPI teachers to student written ability to interpret literature. One of the recommendations of this study was the need for further research into the characteristics attributed to high Co scorers and low Co scorers through observation and evaluation in the classroom in order to define teacher behaviors which could be associated with effective and noneffective teachers. If learning outcomes of students relate to high complexity teachers, then it seemed probable that a trait such as tolerance to ambiguity and preference for complexity as measured by the Co Scale of the OPI would relate to verbal reactions which the teacher creates in the classroom. The present study focused its attention on determining if there were differences

between the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the Omnibus Personality Inventory and teachers who score low on the Co Scale of the Omnibus Personality Inventory. The measure of perception called Complexity--Co, is related to an open, creative approach to phenomena and is a measure of intellectual disposition or orientation (OPI, 1962). Co has its highest correlations with the measures of Creative Personality (.58) and Intellectual Quality (.52) on the Opinion, Attitude and Interest Survey (OAIS). It correlates -.33 with the measure of a need for Order in the Edwards Personal Preference Schedule and .47 with a need for Autonomy. In terms of the Activities Index, Co correlates .46 with a need for change and a -.49 with a need for order. The estimate of reliability for the OPI was based on three different samples. Estimates of the internal consistency of the OPI measures and the test-retest values range from .67 to .89.

Method

Procedure

Teachers and students participating in this study were a part of the freshman English program at the University of Kentucky, Lexington, in the spring semester of 1978. One semester prior to the study, 40 University of Kentucky freshmen English teachers were tested and ranked according to the norms in the OPI Manual. Teachers with the six highest and the six lowest scores on the Co Scale were identified and these teachers had the following in common: course level taught, number of hours of influence on or exposure to students in the classroom, as well as the same amount of exposure to the basic curricular philosophy of the University of Kentucky's Department of Freshmen English Studies. Classes of each teacher

selected were observed by a trained observer for a period of four weeks. This four week period was divided into two weeks at the beginning of the semester and two weeks at the middle of the semester. Duration of the observations was equal for all the classes. The observation instrument used to code verbal reactions was Gordon Mork's Verbal Reaction Behavior Log.

Instrumentation

Gordon M. A. Mork (1971) of the University of Minnesota developed the Verbal Reaction Behavior Log (VRBL) in response to a need for a simple straightforward instrument for recording behavior classified according to learning outcomes and objectives as they are typically found in curriculum guides and instructional plans. Mork listed three purposes of the VRBL:

1. Direct Purpose: the direct purpose of the VRBL is to make a frequency tally record of the occurrence of certain selected groups of classroom verbal behaviors of teacher and/or pupils.

2. Functional Purpose: the functional purpose of the VRBL is to provide a record of the "type" and "level" of verbal behavior according to the categories and subcategories identified. It does not purport to do more than this. This record, however, may then be used in whatever way the users desire.

3. Ultimate Purpose: the ultimate purpose of the VRBL is to provide data to test the hypothesis that there is a relationship between the attainment of educational objectives and the verbal behavior of the teacher and/or pupils.

The VRBL has three major categories: Cognitive, Skill, and Affective. There are three subcategories under each heading. Cognitive Level I consists of facts, terms, names, concepts, minor ideas and associations; Cognitive Level II encompasses classifications, principles, generalizations, explanations, major ideas and relationships; Cognitive Level III includes applications, problem solutions, extrapolations, and creative ideas. Skill

Level I consists of directions and instructions; Skill Level II encompasses drill and repetitive practice or performance; Skill Level III includes altered or varied practice or performance. Affective Level I consists of personal involvement or identification; Affective Level II encompasses positively toned or supportive statements or reinforcements; Affective Level III includes negatively toned reinforcement or verbalization, sarcasm, anger, and punishment.

The VRBL is a frequency or tally instrument. Its basic unit is the sentence or sentence equivalent. Every time a new sentence is spoken, a tally is made in the proper blank. The completed blank identified how often a given verbal behavior has occurred in the situation observed. A copy of the VRBL is found on the following page.

To investigate the identifiability of the categories of the VRBL and the consistency of observers in its use, Leonard (1963) conducted a study of the use of the VRBL in fifth grade classrooms. She gave three training sessions plus two practice sessions with films to twelve observers working in teams of three, making three visits of 30 minutes each to record the verbal behavior of 20 randomly selected student teachers. Leonard found that observers could, with this much training, agree to a very high degree of classification of verbal behavior in such categories as teacher talk, pupil talk, and asking or telling. They showed a lower, but relatively satisfactory consistency of agreement in identifying verbal behavior as classified under the headings of cognitive, skill, or affective, respectively.

Familiarity with VRBL was established by Amershek (1966) through a series of training sessions for the observers. These sessions utilized tape recordings, kinescopes, and actual classroom teaching. The observers

(VRBL)
Tentative Form D.

University of Minnesota Mork et al College of Education

BROAD INSTRUCTIONAL OBJECTIVE OR VERBAL CATEGORY	VERBAL EXPRESSION OF--	SOURCE AND CLASSIFICATION OF VERBAL BEHAVIOR BY			
		TEACHER		PUPIL	
		TELLING	ASKING	TELLING	ASKING
I. COGNITIVE	1-facts, terms, names; concepts; minor ideas and associations				
	2-classifications; principles, generalizations; major ideas and relationships				
	3-applications; problem solutions, extrapolations, creative ideas				
II. SKILL	4-directions, instructions				
	5-drill, repetitive, practice or performance				
	6-altered or varied practice or performance				
III. AFFECTIVE	7-personal involvement or identification				
	8-positively toned or supportive statements of reinforcement or encouragement				
	9-negatively toned reinforcement or verbalization; sarcasm, anger, punishment				

practiced classifying speech units appearing in tape recordings and kinescopes and compared their judgments after each observation. These discussions served as a means of sharply defining the limits of each category. There were ten hours spread over three weeks of one and two hour sessions of both individual and joint practice with the instrument. At the end the group observed three classroom lessons of approximately 40 minutes each. The reliability coefficient for these three observations was found to be .92.

Observers

Insofar as was possible, the schedules of the 12 teachers were arranged by the Director of Freshmen English so that no more than two selected teachers were teaching Freshmen English in the same hours. Two observers were selected. Selection and training of more than two observers was considered too difficult because the following criteria were necessary for adequate observation: (1) an observer with at least a B.A./B.S. degree and (2) an observer who would be willing to commit himself/herself for a period of four weeks.

For the present study, the VRBL was tested by the two observers for observer agreement in two distinct phases. Phase one included (1) the selection of a class which had an observation room which allowed the observers to become familiar with the instrument and to discuss any verbal reactions which presented difficulty in coding; (2) use of the observation room for six class periods of 50 minutes each; (3) no establishment of observer agreement at this point as the concerns were for familiarization of the form and discussion. Phase two included (1) the selection of two classes to observe to establish observer agreement (2) observation of both

of these classes by both observers for a two week period. Observer agreement was based on a .88 correlation between coders.

The design for this study included a built-in control factor of observer agreement in that the analysis of variance model which was used was constructed so that if the observer agreement was not adequate, then the rater factor would have been included in the model. Since the observer agreement was established as significant, the coder effect was removed from the formula. The model for each of the analyses was:

$$Y_{ijkm} = u+C_j+S_{i/j}+T_k+CT_{jk}+TS_{ik/j}+P_m+CP_{jm}+TP_{km}+CPT_{jkm}+PS_{im/j}+PTS_{im/j}+PTS_{ikm/j}+E_{ijkm}$$

Y_{ijkm} = one of six observations on teacher or pupil in a high or low Co group at early or middle time

u = grand mean

C_j = complexity effect

$S_{i/j}$ = subjects (classrooms) within complexity group

T_k = time effect

CT_{jk} = complexity and time interaction effect

$TS_{ik/j}$ = nested subjects (classrooms) by time interaction effect

P_m = person effect

CP_{jm} = complexity and person interaction effect

TP_{km} = time and person interaction effect

CPT_{jkm} = complexity and time and person interaction effect

$PS_{im/j}$ = nested classrooms by time and person interaction effect

$PTS_{ikm/j}$ = nested classrooms by time and person interaction effect

E_{ijkm} = error of measurement associated with sampling Y_{ijkm}

Each of the classes observed was of the same time duration. No attempt was made to equalize verbal productivity across all classrooms since the observers were involved in recording natural discussions.

Data were analyzed using a three factor analysis of variance from a repeated measure design. Complexity was the grouping factor. The complexity factor had a high level and a low level. Time and person were the repeated factors. The time had an early and a middle semester time. The person factor had a teacher and student person.

Nine analyses were performed. The dependent variables were the nine levels of Mork's Verbal Reaction Behavior Log. These nine levels are subcategories of the three major categories of Cognitive, Skill, and Affective.

Results

Since it was the purpose of this study to see whether there was a significant difference between the intellectual disposition of teachers and the verbal reactions in classroom environments created by these teachers, the following main effect null hypothesis was tested:

H_o1: There is no difference in verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

The three minor hypotheses for the Cognitive Levels were:

H_o2: There is no difference at Cognitive Level I in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 1.1, there is a significant CxPxT interaction at the .03 level. Thus null hypothesis H_o2 can be rejected. The complexity

TABLE 1.1

Cognitive Level I

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	149744.6	5.45	0.04 NI
Subjects (S)+ w/in C	10	27473.8		
Time (T)	1	22144.9	1.68	0.22 NS
CxT	1	54472.5	4.13	0.07 NS
SxT w/in C	10	13198.4		
Person (P)	1	214802.2	78.80	0.01 NI
CxP	1	21547.6	7.90	0.02 NI
SxP w/in C	10	2725.1		
PxT	1	16912.5	18.99	0.01 NI
CxPxT	1	6097.5	6.85	0.03 *
SxPxT w/in C	10	890.5		

+ = subjects are classrooms

NI = The P-values are not interpretable since the three factor interaction is significant.

* Statistically significant at the P=0.05 level.

by person by time means is plotted in Figure 1.1. In the first cognitive level, which consisted of facts and minor concepts, there was less verbal interaction in high complexity teacher classrooms than in low complexity teacher classrooms. This verbal interaction was decreased by the high complexity teachers by middle semester, but the verbal reactions by the low complexity teachers increased by middle semester. Furthermore, pupils in the high complexity classrooms and pupils in the low complexity classrooms exhibited almost the same verbal reactions early semester, which would suggest that the pupils in the high complexity classrooms and the pupils in the low complexity classrooms were receiving basic information at this level at early semester, and pupils in the low complexity classrooms continued receiving basic information even at middle semester as evidenced by the fact that low complexity students' verbal responses more than doubled by middle semester. It appears the high complexity teachers moved on to other, more complex cognitive levels, while the low complexity teachers chose to remain at this level and to increase teacher verbalization at this level. Cognitive Levels II and III are increasingly difficult levels of verbalization, as Cognitive Level II includes classifications and major relationships and Cognitive Level III includes applications and creative ideas.

H_o3: There is no difference at Cognitive Level II in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 1.2, there is a significant CxP interaction at the .04 level. Thus null hypothesis H_o3 can be rejected. A plot of the complexity by person means is in Figure 1.2. As the time effect is not significant, the plot averages Time 1 (Early Semester) and Time 2 (Middle Semester). This

FIGURE 1.1

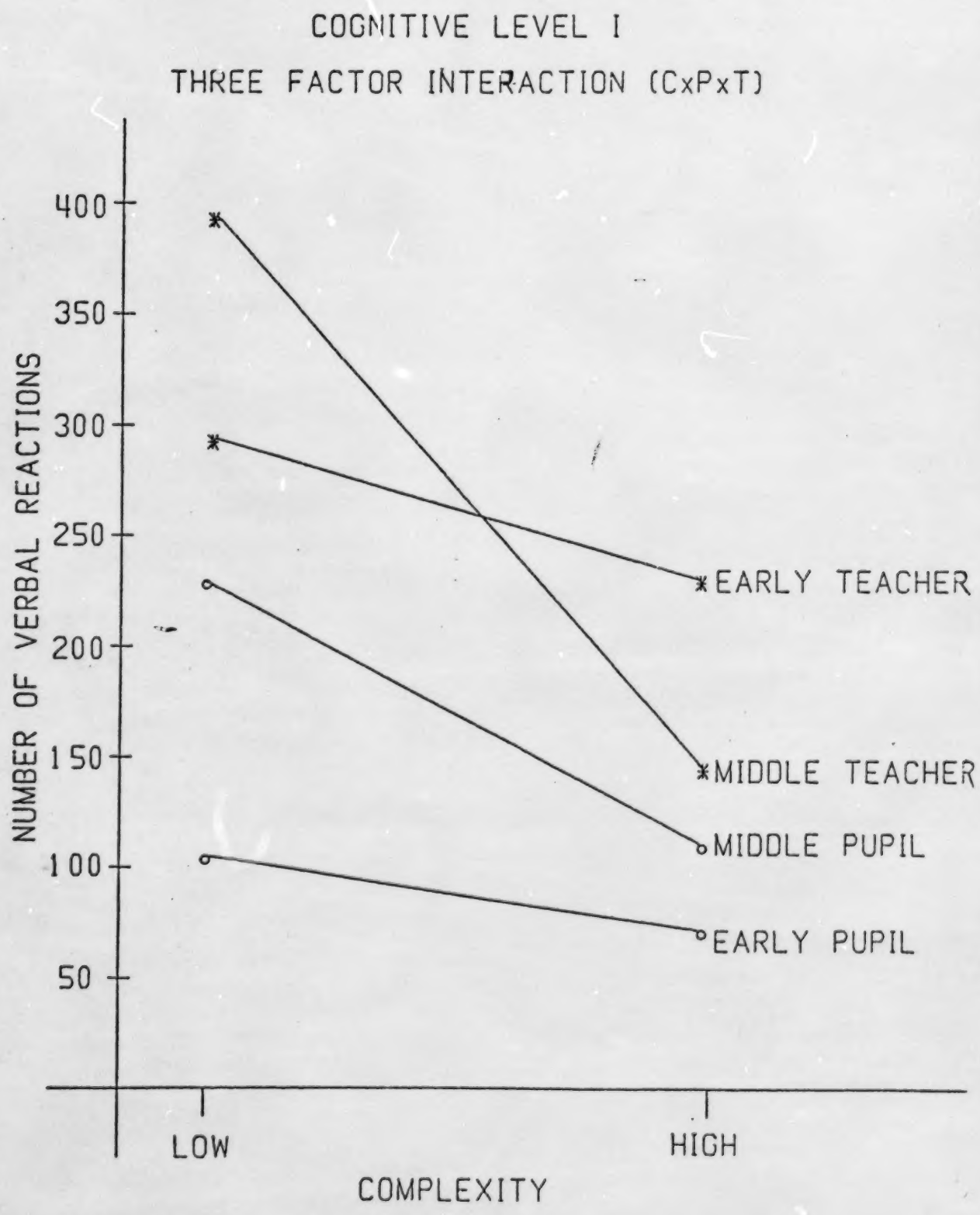

COGNITIVE LEVEL I
THREE FACTOR INTERACTION (CxPxT)
NUMBER OF VERBAL REACTIONS
400
350
300
250
200
150
100
50
LOW
HIGH
COMPLEXITY
EARLY TEACHER
MIDDLE TEACHER
MIDDLE PUPIL
EARLY PUPIL

TABLE 1.2

Cognitive Level II

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	371887.3	6.16	0.03 NI
Subjects (S)+w/in C	10	60420.3		
Time (T)	1	11500.9	1.70	0.22 NS
CxT	1	24254.8	3.59	0.09 NS
SxT w/in C	10	6752.8		
Person (P)	1	86105.7	17.48	0.01 NI
CxP	1	26743.3	5.43	0.04 *
SxP w/in C	10	4925.1		
PxT	1	379.7	<1.0	0.41 NS
CxPxT	1	1073.5	2.10	0.18 NS
SxPxT w/in C	10	510.2		

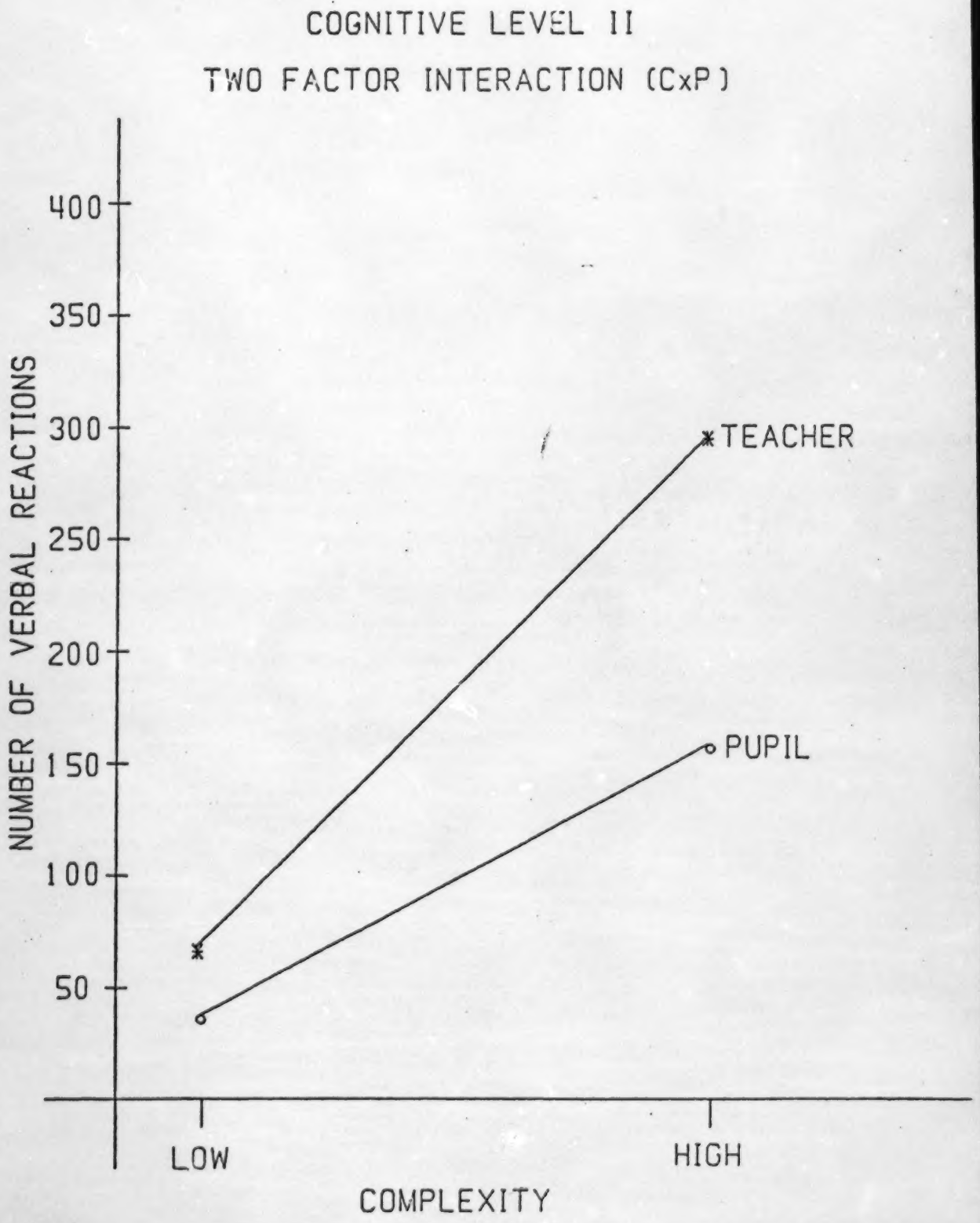
+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS = Not significant

* Statistically significant at the P=0.05 level.

FIGURE 1.2


COGNITIVE LEVEL II
TWO FACTOR INTERACTION (CxP)
NUMBER OF VERBAL REACTIONS
400
350
300
250
200
150
100
50
TEACHER
PUPIL
LOW
HIGH
COMPLEXITY

will remain true of all plots wherein time is not significant. Figure 1.2 shows that high complexity teachers displayed uniformly more verbal behavior than any other group. The students in the high complexity classrooms displayed more verbal behavior than the low complexity teachers and the students in the low complexity classrooms in terms of verbal behavior.

H_o4: There is no difference at Cognitive Level III in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 1.3, there is a significant CxP interaction at the .05 level. Thus null hypothesis H_o4 can be rejected. A plot of the complexity by person means is in Figure 1.3 which shows that the high complexity teachers spent more time in this level than did the low complexity teachers.

Results in Cognitive Levels II and III indicate that high complexity teachers were more likely to encourage the use of higher mental processes rather than mere recall. Low complexity teachers, it would appear, were more likely to continue to spend more time at Cognitive Level I.

Table 1.4 is a Table of Means by the dependent variables according to the structure of the analysis by independent variables.

The three minor hypotheses for the Skill Levels were:

H_o5: There is no difference at Skill Level I in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 2.1, there was no significant difference involving complexity. Therefore, null hypothesis H_o5 is accepted.

H_o6: There is no difference at Skill Level II in the verbal

TABLE 1.3

Cognitive Level III

Analysis of Variance

Source of variation	df	MS	F-value	P-Value
Complexity (C)	1	118404.8	8.09	0.02 NI
Subjects (S)+w/in C	10	14635.3		
Time (T)	1	4408.3	<1.0	0.38 NS
CxT	1	19926.5	3.86	0.08 NS
SxT w/in C	10	5162.1		
Person (P)	1	67950.4	13.94	0.01 NI
CxP	1	23762.8	4.87	0.05 *
SxP w/in C	10	4874.7		
PxT	1	2640.3	1.15	0.31 NS
CxPxT	1	7450.0	3.23	0.10 NS
SxPxT w/in C	10	2303.2		

+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS - Not significant

* Statistically significant at the P=0.05 level.

FIGURE 1.3

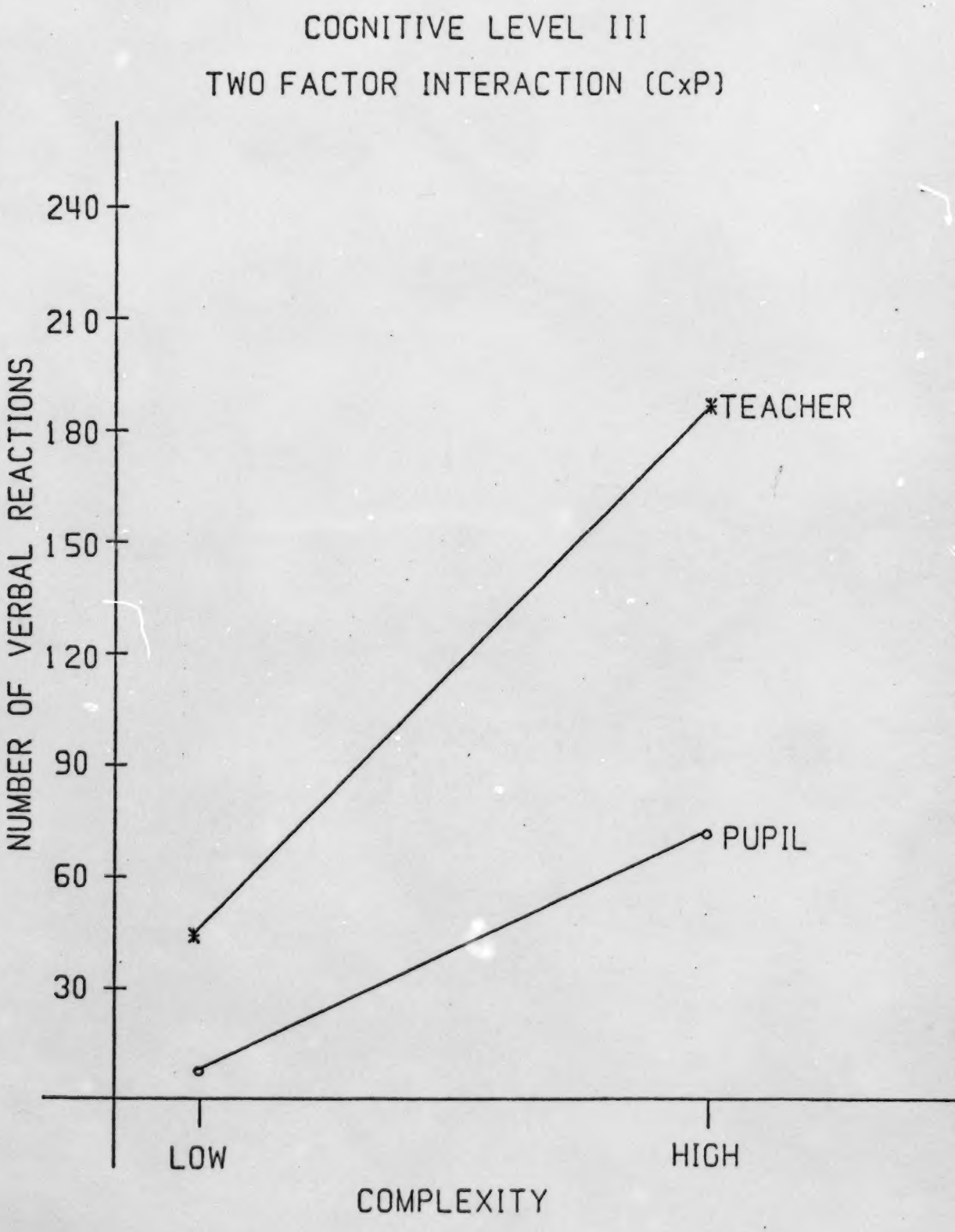

COGNITIVE LEVEL III
TWO FACTOR INTERACTION (CxP)
NUMBER OF VERBAL REACTIONS
240
210
180
150
120
90
60
30
TEACHER
PUPIL
LOW
HIGH
COMPLEXITY

TABLE 1.4

TABLE OF MEANS

Cognitive Level I

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	228.17	76.67	142.67	112.33	292.33	101.17	387.67	226.50

$F = 6.85$ $df_1 = 1$ $df_2 = 10$ $P = 0.03$

Cognitive Level II

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	245.33	128.50	336.33	189.33	76.5	35.17	58.67	25.

$F = 5.43$ $df_1 = 1$ $df_2 = 10$ $P = 0.04$

Cognitive Level III

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	137.67	57.67	237.33	77.83	59.50	18.67	27.83	7.17

$F = 4.87$ $df_1 = 1$ $df_2 = 10$ $P = 0.05$

Sample size is consistently 6

T = Teacher

P = Pupil

E = Early Semester

M = Middle semester

H = High Co

L = Low Co

TABLE 2.1

Skill Level I

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	927.5	1.58	0.24 NS
Subjects (S)+w/in C	10	588.7		
Time (T)	1	247.5	1.26	0.29 NS
CxT	1	346.7	1.77	0.21 NS
SxT w/in C	10	196.0		
Person (P)	1	43260.0	170.50	0.01 NI
CxP	1	391.0	1.54	0.24 NS
SxP w/in C	10	253.7		
PxT	1	1575.2	9.55	0.01 *
CxPxT	1	402.5	2.44	0.15 NS
SxPxT w/in C	10	165.0		

+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS = Not significant.

* Statistically significant at the P=0.05 level

reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 2.2, there is a significant CxP interaction at the .05 level. Thus null hypothesis H_o6 can be rejected. The complexity by person means is plotted in Figure 2.2, which shows that the high complexity teachers ranked higher than the other complexity groups in terms of the number of second level skills responses. The pupils in the high complexity classrooms were involved in nearly as many verbal interactions as the teachers in the low complexity classrooms; however, these responses are quite small. There is not much difference in the verbal responses in the pupils in the low complexity classrooms and the pupils in the high complexity classrooms. The major difference is between the high complexity teachers and the low complexity teachers in terms of the amount of verbal reactions in the classrooms.

H_o7: There is no difference at Skill Level III in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 2.3, there is a significant CxP interaction in Skill Level III at the .02 level. Thus null hypothesis H_o7 can be rejected. The complexity by person means is plotted in Figure 2.3 which shows that the teachers in the high complexity classrooms have more verbal responses than the teachers in the low complexity classrooms. The pupils in the high complexity classrooms also have more verbal responses than the pupils in the low complexity classrooms; however, the number of verbal responses is low in Skill Level III.

TABLE 2.2

Skill Level II

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	1541.3	4.83	0.05 NI
Subjects (S)+w/in C	10	319.2		
Time (T)	1	176.3	0.76	0.40 NS
CxT	1	10.1	0.04	0.84 NS
SxT w/in C	10	231.0		
Person (P)	1	1925.3	13.32	0.01 NI
CxP	1	690.1	4.77	0.05 *
SxP w/in C	10	144.5		
PxT	1	80.8	0.99	0.34 NS
CxPxT	1	0.3	0.01	0.95 NS
SxPxT w/in C	10	80.9		

+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS = Not significant

* Statistically significant at the P=0.05 level

FIGURE 2.2

SKILL LEVEL II

TWO FACTOR INTERACTION (CxP)

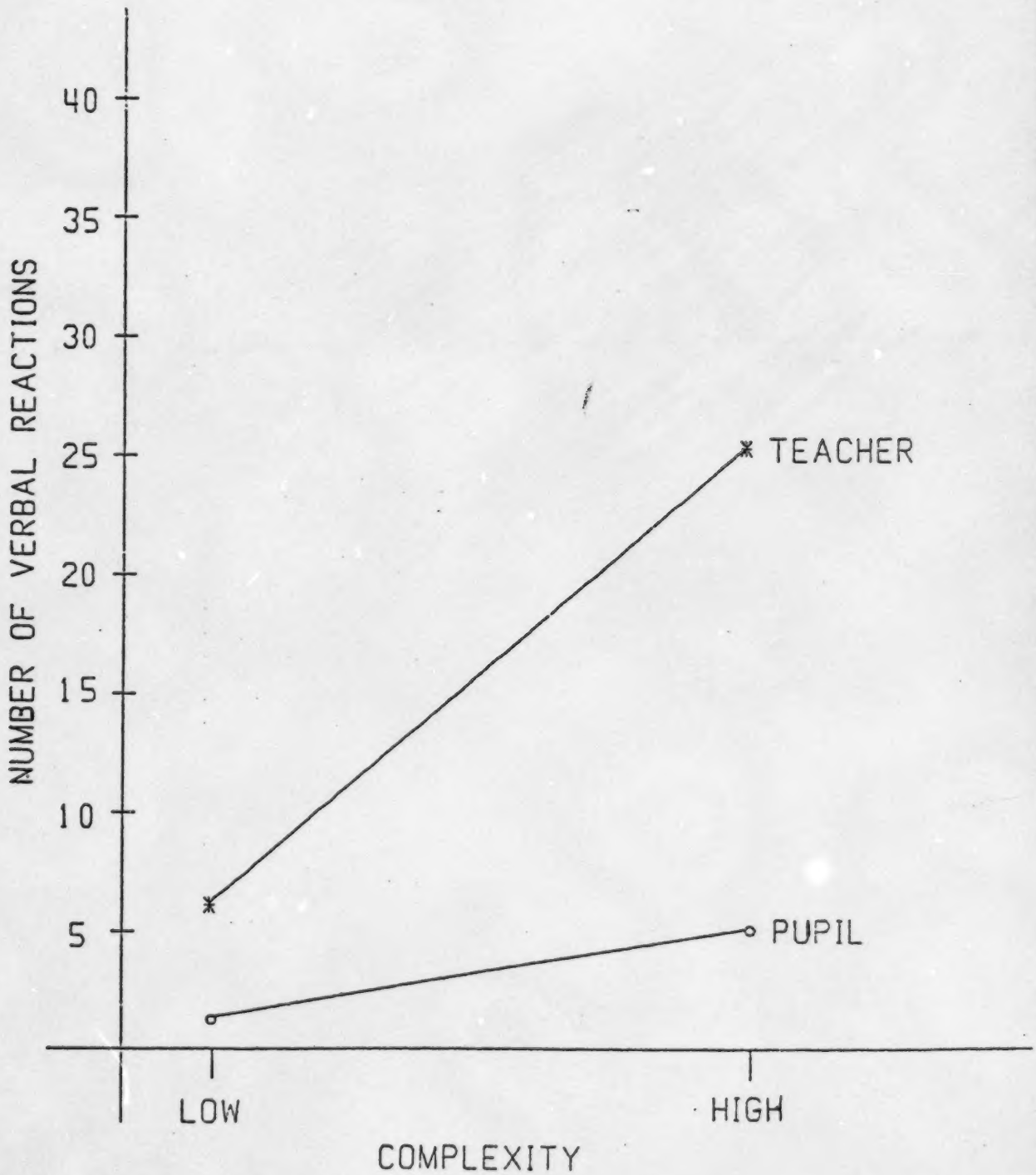


TABLE 2.3

Skill Level III

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	884.1	5.90	0.03 NI
Subjects (S)+w/in C	10	149.9		
Time (T)	1	16.3	0.52	0.49 NS
CxT	1	2.1	0.07	0.80 NS
SxT w/in C	10	31.5		
Person (P)	1	1026.7	22.52	0.01 NI
CxP	1	320.3	7.03	0.02 *
SxP w/in C	10	45.6		
PxT	1	2.1	0.12	0.74 NS
CxPxT	1	12.0	0.67	0.43 NS
SxPxT w/in C	10	17.8		

+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS = Not significant

* Statistically significant at the P=0.05 level

FIGURE 2.3

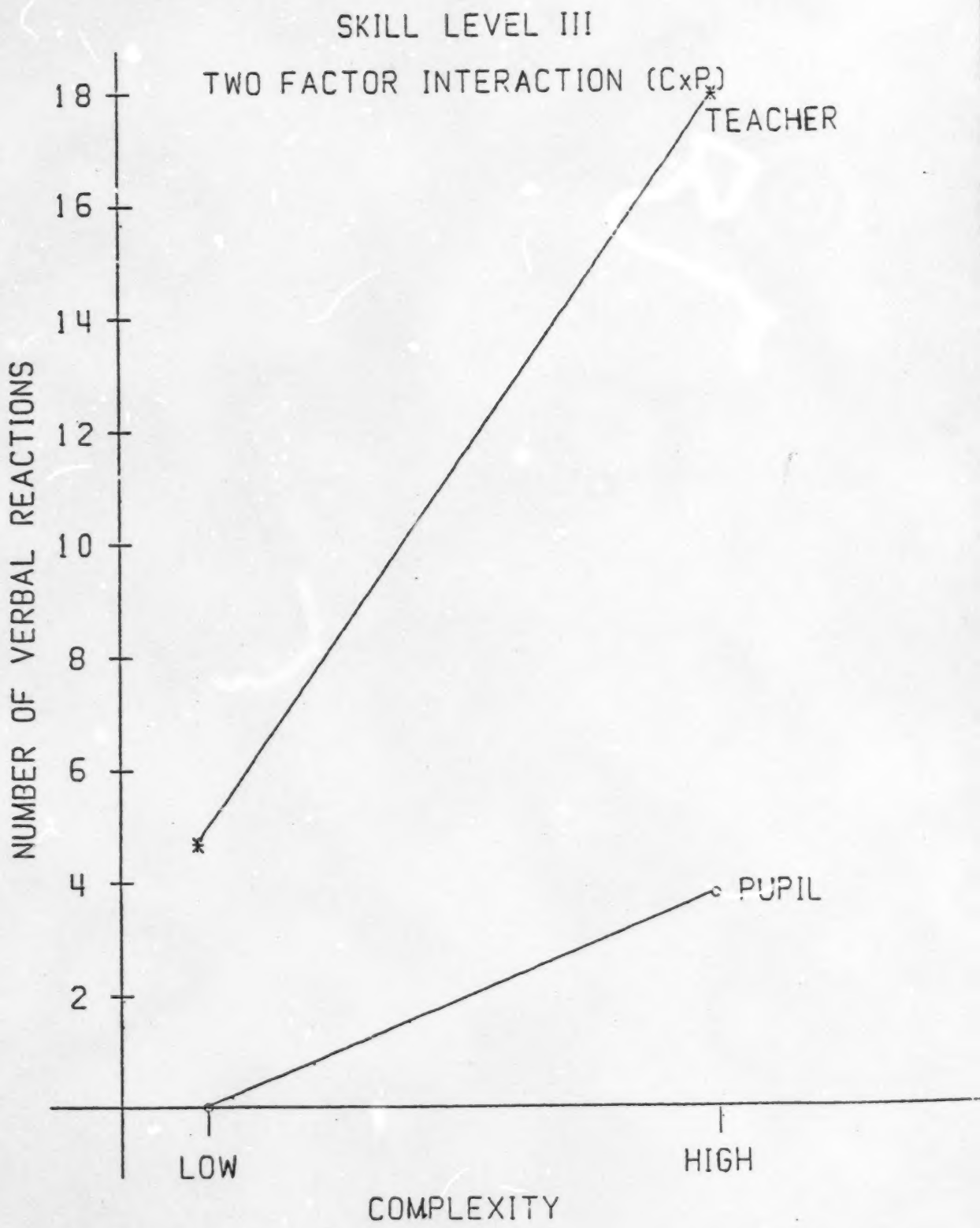

SKILL LEVEL III
TWO FACTOR INTERACTION (CxP)
TEACHER
PUPIL
NUMBER OF VERBAL REACTIONS
18
16
14
12
10
8
6
4
2
LOW
HIGH
COMPLEXITY

Table 2.4 is a Table of Means by the dependent variables according to the structure of the analyses by independent variables.

Results in Skill Level II suggest that if the directions given in Skill Level I are inadequate, high complexity teachers search for and find alternate and varied methods of presenting information. It also appears from results in Skill Level III that high complexity teachers more often present a diversity of practices at this level. This is consistent with the concept presented in the Co Scale that high complexity teachers are original, innovative, and creative in finding diverse explanations as well as accepting a variety of responses. However, it must be noted that the Skill Levels did not contain many verbal reactions when compared with the Cognitive and Affective Levels.

The three minor hypotheses for the Affective Levels were:

H_o8: There is no difference at Affective Level I in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 3.1, there is a significant CxPxT interaction at the .04 level. This complexity by person by time interaction is similar to the interaction in Cognitive Level I in that it is affected by the time factor and is plotted in Figure 3.1 which indicated that the lowest of the high complexity group has more responses than the highest of the low complexity group. In the high complexity group, the middle semester is quite substantially above the early semester time, while in the low complexity group, there is hardly any difference in early and middle semester time reactions. Every one of the high complexity means is above every one of the low complexity means.

TABLE 2.4

TABLE OF MEANS

Skill Level I

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	92.67	9.70	65.50	17.00	67.	7.	62.20	13.50

$F = 9.55$ $df_1 = 1$ $df_2 = 10$ $P = 0.01$

Skill Level II

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	28.	5.	22.33	4.83	9.83	2.33	2.67	0.00

$F = 4.77$ $df_1 = 1$ $df_2 = 10$ $P = 0.05$

Skill Level III

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	18.67	4.83	17.67	2.67	5.50	0.00	3.33	0.02

$F = 7.03$ $df_1 = 1$ $df_2 = 10$ $P = 0.02$

Sample size is consistently 6

T = Teacher

P = Pupil

E = Early Semester

M = Middle Semester

H = High Co

L = Low Co

TABLE 3.1

Affective Level I

Analysis of Variance

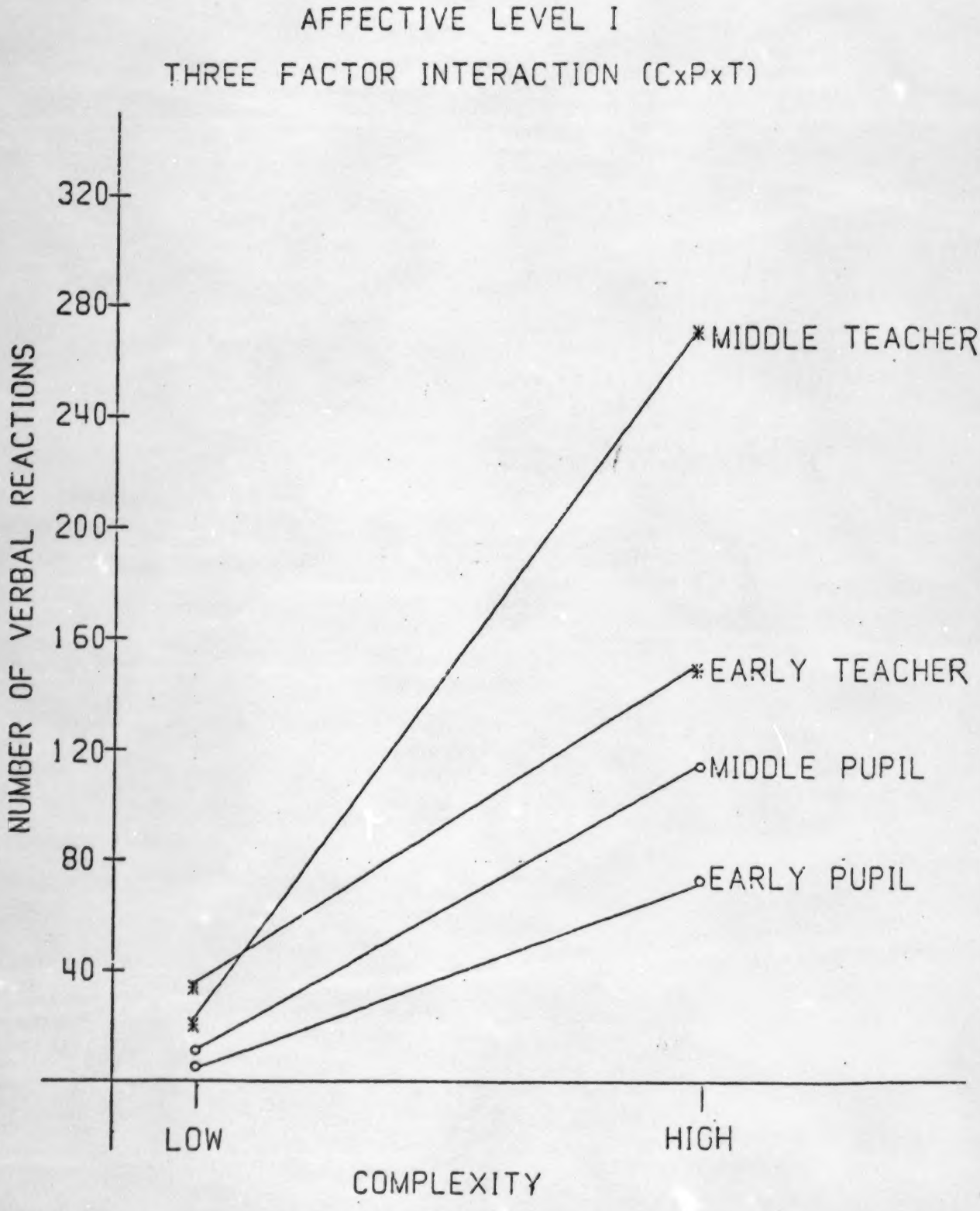
Source of variation	df	MS	F-value	P-value
Complexity (C)	1	206455.7	7.90	0.02 NI
Subjects (S)+w/in C	10	26141.1		
Time (T)	1	17480.2	3.03	0.11 NS
CxT	1	20501.1	3.56	0.09 NS
SxT w/in C	10	5759.7		
Person (P)	1	60776.2	13.76	0.01 NI
CxP	1	25946.8	5.88	0.04 NI
SxP w/in C	10	4416.4		
PxT	1	3008.3	2.81	0.13 NS
CxPxT	1	5720.3	5.34	0.04 *
SxPxT w/in C	10	1071.0		

+ = subjects are classrooms

NI = The P-values are not interpretable since the three factor interaction is significant.

* Statistically significant at the P=0.05 level

FIGURE 3.1


AFFECTIVE LEVEL I
THREE FACTOR INTERACTION (CxPxT)
NUMBER OF VERBAL REACTIONS
320
280
240
200
160
120
80
40
MIDDLE TEACHER
EARLY TEACHER
MIDDLE PUPIL
EARLY PUPIL
LOW
HIGH
COMPLEXITY

H_o9: There is no difference at Affective Level II in the verbal reactions in classroom environments by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 3.2, there is a significant CxP interaction at the .03 level. Thus null hypothesis H_o9 can be rejected. The complexity by person means is plotted in Figure 3.2 which shows that teachers in the high complexity group had substantially more positive verbal responses than the teachers in the low complexity group. Also, the responses of the pupils in the high complexity classrooms were almost the same as the responses of the teachers in the low complexity classrooms.

H_o10: There is no difference at Affective LevelIII in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI.

As can be seen in Table 3.3, there was no significant difference involving complexity. Therefore, null hypothesis H_o10 is accepted.

Table 3.4 is a Table of Means by the dependent variables according to the structure of the analyses by independent variables.

Affective Levels I and II indicate that high complexity teachers were more likely to give positive personal interactions than low complexity teachers. At Affective Level I, it appeared that the high complexity teachers continued and even increased personal verbal reactions with students, while the low complexity teachers hardly increased the already minimal verbal reactions. At Affective Level II, the high complexity teachers gave more positive reinforcement than the low complexity teachers gave while positive responses from the students were not significant factors. High

TABLE 3.2

Affective Level II

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	28323.9	6.52	0.03 NI
Subjects (S)+w/in C	10	4343.5		
Time (T)	1	420.1	1.09	0.32 NS
CxT	1	1008.3	2.61	0.14 NS
SxT w/in C	10	386.8		
Person (P)	1	37520.1	14.28	0.01 NI
CxP	1	17480.2	6.65	0.03 *
SxP w/in C	10	2627.7		
PxT	1	108.0	0.72	0.42 NS
CxPxT	1	444.1	2.96	0.12 NS
SxPxT w/in C	10	149.8		

+ = subjects are classrooms

NI = The P-values are not interpretable since the two factor interaction is significant.

NS = Not significant

* Statistically significant at the P=0.05 level

FIGURE 3.2

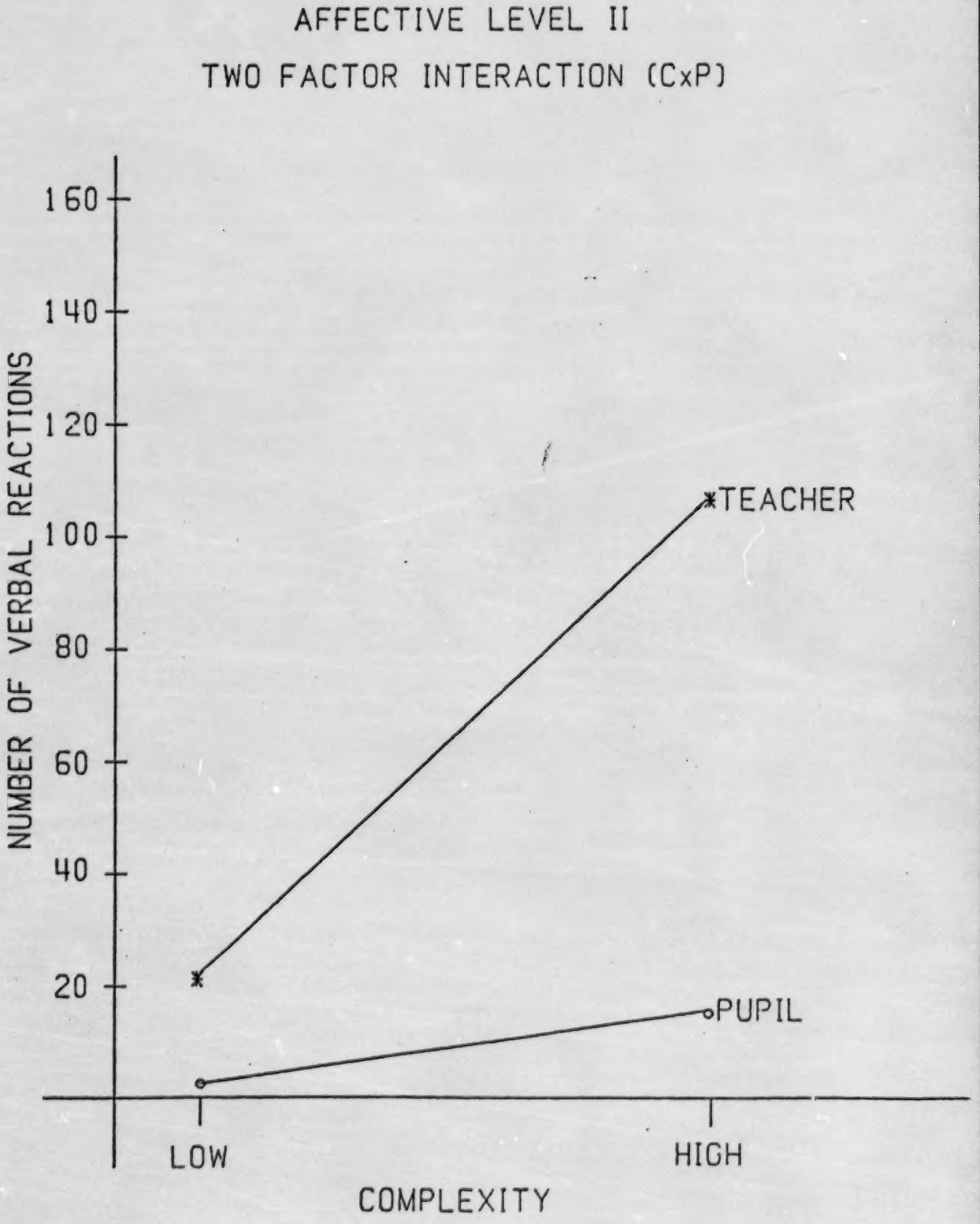

AFFECTIVE LEVEL II
TWO FACTOR INTERACTION (CxP)
NUMBER OF VERBAL REACTIONS
160
140
120
100
80
60
40
20
TEACHER
PUPIL
LOW
HIGH
COMPLEXITY

TABLE 3.3

Affective Level III

Analysis of Variance

Source of variation	df	MS	F-value	P-value
Complexity (C)	1	111.0	3.87	0.08 NS
Subjects (S)+w/in C	10	28.0		
Time (T)	1	9.2	0.76	0.40 NS
CxT	1	0.5	0.04	0.84 NS
SxT w/in C	10	12.1		
Person (P)	1	697.7	33.6	00.1*
CxP	1	93.5	4.5	0.06 NS
SxP w/in C	10	20.7		
PxT	1	38.5	2.76	0.13 NS
CxPxT	1	4.7	0.34	0.58 NS
SxPxT w/in C	10	13.9		

+ = subjects are classrooms

NS = Not significant

* Statistically significant at the P=0.05 level

TABLE 3.4

TABLE OF MEANS

Affective Level I

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	150.50	70.50	267.67	112.33	36.	5.33	26.83	8.17

$F = 5.34$ $df_1 = 1$ $df_2 = 10$ $P = 0.04$

Affective Level II

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	93.33	8.33	117.50	14.33	21.83	1.	15.50	0.83

$F = 6.65$ $df_1 = 1$ $df_2 = 10$ $P = 0.03$

Affective Level III

Co	H	H	H	H	L	L	L	L
Person	T	P	T	P	T	P	T	P
Time	E	E	M	M	E	E	M	M
Mean	13.	0.17	9.50	1.50	6.33	0.33	4.50	0.83

$F = 33.6$ $df_1 = 1$ $df_2 = 10$ $P = 00.1$

Sample size is consistently 6

T = Teacher

P = Pupil

E = Early Semester

M = Middle Semester

H = High Co

L = Low Co

complexity teachers and low complexity teachers exhibited very little verbal behavior in Affective Level III. Both high and low complexity teachers apparently avoided negative reinforcement.

As seven of the nine minor hypotheses were rejected and as each of these minor hypotheses was related directly to the major hypothesis, the main effect null hypothesis H_o1 that there is no difference in the verbal reactions in classroom environments created by teachers who score high on the Co Scale of the OPI and teachers who score low on the Co Scale of the OPI was rejected.

Limitations

One limitation of the study was the method of student grouping under teachers. The design would have been tighter if it had been possible to select students randomly prior to registration from the group of freshmen, then assign them to the teachers selected in the previously described manner. However, students were enrolled in the usual way by the English department, and it was felt that this limitation was not severe enough to justify the kinds of administrative problems that requesting re-enrollment would have involved. In fact, it is doubtful that it could have been done even if requested. Since freshmen students for the most part are not aware of the identity or personality of English teachers, it is doubtful that choice of teacher could become an important factor. Also, all classes participating in the study were within the normal class day, and it seems reasonable to assume that certain categories of students did not congregate in specific classes and that a certain randomization did occur naturally.

In summary, the study includes a finding of significance in the main effect of the verbal responses in classes of the teacher characteristic measured by the Co Scale of the OPI. The main effect null hypothesis H_o1 is rejected, and the data suggest that the teacher characteristic measured

by the Co OPI does have an effect on the verbal reactions of students.

Discussion

This study provides evidence that high complexity teachers move their students into higher levels of cognition which allows for challenges to student thinking. It appears that high complexity teachers have an intellectual disposition which mentally challenges student thought and demands more support for contention, greater divergence in analysis, more contrast, more inference, deeper response. The high complexity teacher appears to be capable of establishing greater interaction in the classroom. It is through interaction that the student becomes more expressive, more conscious of how he is expressing himself, and aware of how his classmates' views either coincide or conflict with his own. Without interaction, he is unable to determine if the teacher, for instance, has explained a certain statement to everyone's satisfaction except his own; he is conscious of the weight of his words and those of his peers; he is more alert to the classroom environment, as he is more a part of it.

The teacher who is himself tolerant of ambiguities and has a preference for complexities apparently does create a different atmosphere in terms of verbal interactions, in terms of the amount of pupil-teacher interaction, in terms of dealing in the highest levels of cognitive and skill development, in terms of allowing more student responses, in terms of personal involvement and positive reinforcement, as well as in terms of dealing in those areas which require innovative and unusual approaches, and specifically in terms of moving students to higher levels of cognition.

Although one criticism of education is that teachers do not challenge

students to move to higher levels of thinking, the results of the interactions in the high complexity teachers' classrooms suggest that teachers possessing those traits characteristic of high Co scorers did allow students high level cognitive verbal interactions. The processes exemplified by high complexity teachers were those which Hilda Taba believed should be encouraged. In her book Curriculum Development: Theory and Practice, she writes:

> If...formulations are presented to the student ready-made, his own perceptions have nothing to do with what is included or omitted from the reservoir of the past. There is no way for him to give meaning to these formulations. He is unaware of the thought forms in terms of which that knowledge is organized. His mind cannot make them his own, use them to form other ideas, and integrate them into a system of generalizations he already has. It is the experience of inquiring, reflecting, relating, and generalizing that is important, not whether ideas and facts that are used for material come from the past or from the current experience.... Teaching for creative and productive thinking must help the student in the reasonable restructuring and reorientation which enables him to see problems, events, and ideas in a new perspective (pp. 116-117).

Evidence would seem to suggest the development of means to train potential teachers in behaviors in tune with those traits characteristic of high Co scorers would be a worthwhile endeavor by teacher training institutions if challenging students to higher levels of thinking is a desired teacher competency.

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